

Length of Marriage and Its Effect on Spousal Concordance in Kuwait

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ABSTRACT It was hypothesized that marriage duration affects physical and cultural homogamy and spousal concordance in Kuwaiti marriages. Westernization increased spousal correlations due to fewer arranged marriages and increased individual spousal choice. Spousal similarities for selected physical and cultural traits were also examined for couples married 15 years or less, 16 to 30 years, and 31 years and more. Consanguineous couples belong to the al-Kandari, one of the largest and most important kindreds in Kuwait, who traditionally married kin and continue to do so. Six physical measurements and blood pressure were taken along with a sociocultural questionnaire to examine cultural preferences. In all, 242 couples (484 people) participated; 62 couples were in non-consanguineous unions. It was hypothesized that in shorter-duration unions spouses would be more alike for physical and cultural traits. For physical traits, results for stature, weight, the body mass index, and hip circumference are congruent with the hypothesis, whereas results for the triceps and subscapular skinfolds, waist circumference, and systolic and diastolic blood pressure are not. Overall, for some traits spouses are more alike than in previous generations, and specific aspects of similarity among long-term spouses reflect historical and cultural phenomena. *Am. J. Hum. Biol.* 14:1–8, 2002. © 2002 Wiley-Liss, Inc.

Assortative mating, a correlation between partners in some character, is the dominant mating pattern worldwide (Spuhler, 1968). Positive assortative mating occurs when individuals who resemble one another mate more frequently than is expected by chance (Harrison et al., 1988). Although many populations tend to assortatively mate, some do not. For example, James et al. (1985) report significant spousal correlation among more “western-oriented,” but not among more “traditional-living,” Samoan couples for stature, systolic and diastolic blood pressure, and level of education. The most significant correlations for stature and systolic and diastolic blood pressure typified Samoan couples married 15 years or less. James et al. (1985) attributed the correlation to the influence of acculturation. In a study of 403 retired, mainly white couples, residing at Rancho Bernado, CA, spousal correlations for both systolic and diastolic blood pressure were significant even among couples married for 40 or more years (Suarez et al., 1983). Beresford (1976) also found that the correlation of blood pressure among spouses varied with length of marriage. In a study of 1,260 white spouses in Connecticut, Speer et al. (1986) determined that the shared marital environment might

influence spousal concordance in systolic and diastolic blood pressure. Generally, it is suggested that the degree of spousal concordance for physical traits increases with the adoption of modern life styles (Baker, 1977).

The hypothesis tested here is that marriage duration affects physical and cultural homogamy and spousal concordance in Kuwaiti couples. For Kuwait, because of recent trends in the past 30 or 40 years toward westernization, it was hypothesized, that the shorter the marriage duration, the more alike spouses will be in physical (stature, fat distribution, and systolic and diastolic blood pressure) and cultural traits (education and religious beliefs and practices). Similar to James et al. (1985), westernization is expected to increase spousal concordance due to the decreasing incidence of arranged marriages over time and increased individual choice of marriage partners.

This research examined concordance for selected cultural and biological traits

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among spouses married less than 15 years (marriage dates, 1984–1998), 16 to 30 years (1969–1983), and 31 years or more (1968 and before). Differences and similarities in stature, subcutaneous fatness, systolic and diastolic blood pressure, education, and religious practices and beliefs at each level of marriage duration were determined.

SAMPLE AND METHODS

Most participants in this study belong to one of the major and largest kin groups in Kuwait, the al-Kandari. The al-Kandari began migrating in large numbers to Kuwait from Iran around the turn of the 20th century. The al-Kandari traditionally engaged in consanguineous marriage and continue to do so today. Therefore, all participants in this study who are either first cousins (related on the mother's or father's sides), double cousins (related on both the father's and mother's sides), or second- and less-than-second-cousin consanguineous marriages belonged to this group. Conversely, participants ($n = 62$) in non-consanguineous marriages are not of the al-Kandari kindred.

Participants were recruited by Yagoub al-Kandari (YAK) through personal and family contacts and invited to enroll in the study protocols. Those agreeing to participate were provided additional information and requested to schedule an interview. Interviews and measurement protocols were completed primarily in the participants' own homes. The first 10 minutes of each interview were used to explain the study and its research goals and to set the participants at ease. An informed consent form was reviewed and signed by each participant. Next, the protocol was started by measuring blood pressure before distributing questionnaires to participants. A second blood pressure measurement was taken immediately after the questionnaire was completed. Physical measurements were then taken. Six standard anthropometric dimensions were taken on each individual: height, weight, triceps and subscapular skinfolds, and hip and wrist circumferences, followed by a third blood pressure measurement. Completion of the questionnaire and measurements took approximately 30 to 45 minutes for each participant.

Measurements were made using standard protocols (Lohman et al., 1988).

Height was measured to the nearest millimeter using a GPM[®] anthropometer with participants standing without shoes and with heels together, toes apart, and the head held in the Frankfort plane.

Weight was measured with a balance scale with participants fully clothed (necessitated by local standards of modesty). No adjustments were made for weight of clothing since both men and women generally wore similar garments.

A metal tape measure was used to measure hip and waist circumferences. For hip circumference, the tape was placed around the buttocks in a horizontal plane at the level of maximum protrusion of the buttocks compressing the outer garments. Waist circumference was measured at the level of the natural waist, which is the narrowest part of the torso below the rib cage and above the hips.

A Lange skinfold caliper was used to measure the triceps and subscapular skinfold thicknesses. The triceps skinfold was measured in the midline of the posterior aspect of the arm over the triceps muscle midway between the lateral projection of the acromion process of the scapula and the inferior margin of the ulnar olecranon process. The subscapular skinfold was taken beneath the inferior angle of the scapula. In both cases a double thickness of skin and underlying tissue was raised and measured.

Blood pressure measurements were completed using an aneroid sphygmomanometer (Braunometer[®] desk model) and a Littman[®] stethoscope. Seated blood pressure was measured after subjects had been resting at least 10 minutes. Blood pressure was measured with either a standard or thigh cuff (for very large arms) on the right arm of the subject. A stethoscope was used to establish systole as the initiation of Korotkov sounds (phase 1) and diastole as the cessation of Korotkov sounds (phase 5). Blood pressure was measured three times with the cuff completely evacuated and recovery allowed between readings. The averages of the three readings were used as the dependent variables, systolic and diastolic blood pressure.

The body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared ($BMI = \text{weight (kg)}/\text{height (m)}^2$).

The sociocultural questionnaire included questions on employment, educational level,

MARRIAGE LENGTH/SPOUSAL CONCORDANCE IN KUWAIT

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TABLE 1. Marriage length by age group

Marriage length, years	Age of husband, years					Total
	20 to 29	30 to 39	40 to 49	50 to 59	60 +	
15 or less						
<i>N</i>	113.0	127.0	—	2.0	—	242.0
%	46.7	52.5	—	0.8	—	50.0
16 to 30						
<i>N</i>	2.0	58.0	92.0	6.0	—	158.0
%	1.3	36.7	58.2	3.8	—	32.6
31 or more						
<i>N</i>	—	—	2.0	40.0	42.0	84.0
%	—	—	2.4	47.6	50.0	17.4
Total						
<i>N</i>	115.0	185.0	94.0	48.0	42.0	484.0
%	23.8	38.2	19.4	9.9	8.7	100.0

type of marriage, date of marriage, degree of spousal kin relationship, attitudes toward consanguinity, ideal marriage age, and the ideal method for spousal selection. Some additional cultural information including Persian (Farsi) language facility, degree of acculturation, regularity and intensity of religious practices, and the amount of physical activity also were obtained by questionnaire. This questionnaire was tested in a pilot study and Cronbach's alpha was 0.80, suggesting construct reliability. Persian language fluency, regularity of religious practice, and level of acculturation were used as indicators of cultural traits to examine cultural concordance among couples in each marriage type. The questionnaire included an acculturation scale modified from that of Hazuda et al. (1988) to fit the Kuwaiti sample. (Copies of the questionnaire are available from YAK). Hazuda et al. (1988) developed a set of scales to operationally describe acculturation and structural assimilation among Mexican Americans in San Antonio and South Texas. Their goal was to see how individuals acculturated at differing rates along separate cultural dimensions, which might then be related to various outcomes, including aspects of mental and physical health.

The Hazuda et al. (1988) scale was modified to capture local information in Kuwait. Every set of acculturation scales must be culturally relevant and include items to obtain information indigenous to a specific study. For example, the degree of religiosity was measured to assess how couples viewed their relationship to Islam; proficiency in Farsi was a measure of how individuals adapted to the local Arab culture in

TABLE 2. Marriage length by marriage type

Marriage type	Marriage length, years			Total
	15 or less	16 to 30	31 or more	
First and double-cousin marriage				
<i>N</i>	102.0	72.0	26.0	200.0
Row %	51.0	36.0	13.0	
Col. %	42.1	45.6	31.0	41.3
Second and less-than-second-cousin marriage				
<i>N</i>	62.0	42.0	56.0	160.0
Row %	38.8	26.3	35.0	
Col. %	25.6	26.6	66.9	33.1
Non-consanguineous marriage				
<i>N</i>	78.0	44.0	2.0	124.0
Row %	62.9	35.5	1.6	
Col. %	32.2	27.8	2.3	25.6
Total				
<i>N</i>	242.0	158.0	84.0	484.0
Row %	50.0	32.6	17.4	100.0

Kuwait; and visitations to local healers measured acculturation as the more highly educated individuals sought out Western-trained medical practitioners.

All data analyses were completed using the SPSS package. Because of the skewed nature of some physical data, log and square-root transformations were used to normalize distributions for hip and waist circumferences and diastolic blood pressure. Pearson correlation coefficients were used to estimate concordance between couples and relationships between cultural and physical traits.

In all, 242 couples (484 people) participated in the study. Based on marriage duration, they were divided into three groups: (1) 242 people (121 couples) married 15 years or less; (2) 158 people (79 couples) married 16 to 30 years; and (3) 84 people (42 couples) married 31 or more years. Ages ranged from 20 to 78 years.

TABLE 3. Age of spouses by marriage type

Age of husband, years	Marriage type			Total
	First- and double-cousin marriage	Second- and less-than- second-cousin marriage	Non-consanguineous marriage	
20 to 29				
<i>N</i>	64	29	22	115
Col. %	32.0	18.1	17.7	23.8
30 to 39				
<i>N</i>	59.0	51	75	185
Col. %	29.5	31.9	60.5	38.2
40 to 49				
<i>N</i>	48	25	21	94
Col. %	24.0	15.6	16.9	19.4
50 to 59				
<i>N</i>	21	23	4	48
Col. %	10.5	14.4	3.2	9.9
60 to 69				
<i>N</i>	8	32	2	42
Col. %	4.0	20.0	1.6	8.7
Total				
<i>N</i>	200	160	124	484
Col. %	100.0	100.0	100.0	100.0

RESULTS

Obviously, length of marriage and chronological age are correlated (Table 1). The study population was divided into five categories related to the husband's chronological ages: 20 to 29 years; 30 to 39 years; 40 to 49 years; 50 to 59 years; and 60 years and over. These age groupings follow practices in other studies (Suarez et al., 1983) and seemed the most appropriate age categories given the sample composition. The youngest age groups, those 20 to 39 years, were married 15 years or less, on average, although a large proportion (58/185, 31.4%) of the 30 to 39 year olds were married for 16 years or over. Those in the oldest age groups, 50 years and over, generally were married 31 years or more.

Persons married 15 years or less accounted for 62.9% of all non-consanguineous marriages. However, the most frequent type of marriage was either first or double-cousin marriages (42.1%), whereas non-consanguineous matings were observed only 32.2% of the time. Second- and less-than-second-cousin marriages are about evenly distributed by length of marriage (Table 2); however, they comprise 66.9% of all marriages of 31 years or more, but only approximately 25% of marriages of 15 or less years and 16 to 30 years. The longest marriages have the fewest non-consanguineous matings (1.6%), but this is likely to be altered as culture change con-

tinues and is probably accelerating, as the older generation expires. Consanguineous matings remain highly frequent in all categories of marriage duration: 67.8%, 72.2%, and 97.7%, although the trend by marriage duration is obvious.

Slightly more than 78% of all respondents in non-consanguineous marriages are 39 years old or younger, whereas only 4.8% are 50 years or older (Table 3). Of this latter group 3.2% are 50 to 59 years old. Obviously, non-consanguineous marriages were extremely rare in Kuwait in past generations. The frequency of non-consanguineous marriages reaches a peak of 40.6% of all marriages among present day 30 to 39 year olds. Conversely, the frequency of first and double cousin marriages is highest among present day 20 to 29 year olds (55.6%) and lowest among those 60 or more years of age (19.0%). Those aged 40 to 49 years show the second highest proportion (51.1%) and those aged 30 to 39 years show the second lowest proportion (31.9%).

There are significant correlations for most sociocultural traits by length of marriage (Table 4). Correlations between spouses for religious observance and educational level are moderate to high in all marriage duration categories. Spousal concordance for degree of acculturation decreases with increasing length of marriage and is non-significant in the longest married couples who also are the smallest subsample. Spousal concordance for Farsi

TABLE 4. Concordance for sociocultural traits by marriage length

Sociocultural traits	Marriage length, years		
	15 or less (<i>n</i> = 121)	16 to 30 (<i>n</i> = 79)	31 or more (<i>n</i> = 42)
Degree of religiosity	0.72***	0.81***	0.75***
Acculturation	0.49***	0.32**	0.27
Language	0.39***	0.32***	0.49**
Occupation	0.45***	0.23*	0.96***
Education	0.45***	0.49***	0.56***

P* < 0.05, *P* < 0.01, ****P* < 0.001.

TABLE 5. Spousal correlations for physical traits by marriage length

Physical traits	Marriage length, years		
	15 or less	16 to 30	31 or more
Stature	0.40**	0.25*	0.14
Weight	0.21*	0.20	-0.22
Body mass index	0.22*	0.15	-0.43**
Triceps skinfold	0.33*	0.18	0.57**
Subscapular skinfold	0.36**	0.34**	0.44**
Waist circumference	0.18*	-0.13	0.30
Hip circumference	0.23**	-0.22*	0.12
Systolic BP	0.26**	0.20	0.46**
Diastolic BP	0.46**	0.13	0.64**

P* < 0.05, *P* < 0.01.

language fluency and occupation are lowest in those in the intermediate marriage duration category and highest in those with the longest marriages. Spousal correlation for occupation approaches unity in the longest married group but is lowest in the marriages of medium duration (0.23) and intermediate in those of shortest duration (0.45).

Spousal correlations for physical traits are generally lowest and least significant in the intermediate marriage duration category (Table 5) in which only concordance estimates for stature, the subscapular skinfold, and hip circumference (negative) are statistically significant. Among those married longest, spousal correlations are larger for the triceps and subscapular skinfolds, systolic and diastolic blood pressure, the BMI (negative), and waist circumference (*P* = 0.08) than in any other class, whereas those for stature and hip circumference are largest in those with the shortest marriage durations (Table 5). Spousal correlations for stature, weight, and the BMI decline consistently with increasing length of marriage. However, correlations for the subscapular skinfold are all in the same range across categories of

marriage duration. Although spousal correlations for blood pressures are highest in those married longest, those married for 15 years or less also show significantly high correlations, whereas the correlations for marriages of intermediate duration are low and non-significant. A similar pattern is seen for the triceps skinfold.

DISCUSSION

The major hypothesis of this study is that in shorter duration unions spouses will be more concordant for physical and cultural traits. Of the sociocultural traits examined, only the result for acculturation level supports this hypothesis. For physical traits, results for stature, weight, the BMI, and hip circumference are congruent with the hypothesis, whereas those for triceps and subscapular skinfolds, waist circumference, and systolic and diastolic blood pressure do not support the hypothesis. Overall, the original hypothesis is poorly supported. However, the observed results do suggest that at least for some traits, spouses are more alike today than in previous generations and that specific aspects of concordance among long-term married couples reflect specific historical/cultural phenomena.

Consanguineous marriages are very common in Kuwait generally, and among the al-Kandari kindred specifically. However, there has been an attitudinal change toward kin marriages. Those 30 to 39 years of age (born 1961–1970) are the first age group heavily impacted by Western influences. This is the first generation after the economic boom.

Two factors likely answer why there is a high percentage of kin marriage in 20 to 29 year olds. The average age (23.2 ± 4.1 years) of non-consanguineous marriages exceeds the average age (21.1 ± 3.1 years)

of kin marriages. Consanguineous unions occur earlier than non-kin unions because they are mostly arranged by the two families rather than the couples themselves. The highest level of educational attainment occurs in non-kin unions because such marriages occur mostly when the couples finish their college or higher education. If the average age of marriage and highest level of educational attainment are controlled, the high percentage of non-consanguineous marriages remains around the same if not higher. More research is needed into this trend.

Most non-consanguineous couples (type-three marriages) are more highly educated than couples in first- and double-cousin marriages (type-one marriages) or second- and other-cousin marriages (type-two marriages). Approximately 82.2% of couples in a non-consanguineous union have a university or college degree, if not a graduate or professional school degree. Of the type-one sample, 56%, and of the type-two sample, 53.7%, have a university degree, graduate school degree, or another professional degree. At the professional level, 12.1% of couples in a non-kin marriage have a professional degree, whereas only 2% of those in first-cousin marriages and 5.6% of those in second- and less-than-second-cousin marriages have professional degrees. The least educated element of the sample (those who can only read and write or perhaps one or the other, or neither) are more prevalent among first- and double-cousin marriages and second- and less-than-second-cousin unions. They constitute 11% and 16.3% of the sample, respectively, whereas only 1.6% of couples in non-kin marriages have a minimal education. In general, the samples are negatively skewed in terms of educational level. This division is strongly related to the young age of the sample.

The oldest group may have had fewer relatives to choose from when they married. The chance to marry their second and less-than-second cousins apparently was greater (66.9%) than the chance to marry from non-kin (2.3%) and first cousins (31.0%). Most of those married 31 and more years belong to the al-Kandari group who migrated to Kuwait from the eastern side of the Arabian Gulf. Entire extended families did not migrate nor did all other relatives; many remained in Iran. Thus, for these early migrants fewer "ideal mates" (first and

double cousins) were available, requiring them to choose slightly further removed relatives for marriage partners rather than the less ideal non-kin partner. Today, younger and particularly higher educated individuals are employed by some arm of the Kuwaiti government. It is primarily within the government employment sector and university setting that single men and women generally interact with any frequency, thereby increasing non-kin marriage opportunities and concordance among younger spouses.

The single non-significant spousal correlation for a cultural trait was for acculturation in couples married 31 years or more. The lower correlation for acculturation in this marriage category may be related to gender differences in how the al-Kandari adapted to the emerging Kuwaiti society. In the early period of emigration to Kuwait, al-Kandari men worked with and for members of the dominant Arab culture, while al-Kandari women either remained in Iran or worked in their homes as housewives. While these early migrating al-Kandari males became acculturated and adapted more fully to the new circumstances in Kuwait, their wives likely remained at home and became less acculturated to the new surroundings.

Occupation has a similar historical/cultural context. We expected to find the highest spousal concordances for occupation, and for these to be highest for couples married for 31 or more years ($r = 0.96$). One reason for this high correlation is that most people married over 31 years are already retired. Until 1993, social security in Kuwait allowed retirement after 20 years of employment for men and 15 years for married women. (In the study sample, those who did not work or were retired were given a number of 1, the lowest level, on a scale of 1–9.) Unfortunately, no data are available on the lifetime occupations for retired individuals. Because they were the least educated, the early migrants generally entered the lower economic rungs as laborers or joined the merchant class in Kuwaiti society. Many women in the early migrant sample never worked outside the home.

High spousal concordance for blood pressure and occupation in marriages of 31 years or more may also reflect cultural interactions. One interpretation of concordance in blood pressure is that when

spouses share a similar environment with the same diet, socioeconomic status, and level of physiological stress over a long period of time, they tend to have similar risks for elevated blood pressure.

Spouses married for 40 years or more from Rancho Bernado, CA, also have high correlations for both systolic and diastolic blood pressure (Suarez et al., 1983). Spousal concordance for obesity and blood pressure in a mountain village of Japan also is significant for those married 15 years or less and 31 years and more (Inoue et al., 1996). Among couples married 15 years or less, blood pressure correlations between spouses may reflect the influence of assortative mating more than those married longer, who may show the effects of long-term shared environments. Causes for these observed correlations can not yet be specified with the available data. Among Samoans, spousal concordance for blood pressure was also higher for couples married 15 years or less, suggesting that acculturation may have been important. Another possibility "... is that mate selection based on social characteristics such as education level may be restructuring the population, aggregating blood pressure phenotypes similar to the phenomenon noted for stature" (James et al., 1985: 650). Pomerat (1936), reporting data from Boston, showed that the highest degree of homogamy, other than for age was the correlation for stature ($r = 0.63$).

This analysis indicates that both culture change due to westernization and "cultural matching" of traits may have affected spousal concordance in Kuwaiti marriages. Non-consanguineous marriages are increasing steadily in Kuwait, likely in part due to Western influences following discovery of oil in 1946 and the increased size of the Kuwaiti government, which hires young, educated, and often single employees. Most non-consanguineous marriages occurred within the past 15 years, perhaps reflecting a change in cultural expectations (Abdullah, 1999). Non-consanguineous marriages enlarge the pool of eligible spouses by including non-relatives. Without a requirement to marry a relative, non-consanguineous marriages may instead be based on preferred physical and/or cultural traits, data not examined here. "Cultural matching," when people choose partners with similar cultural traits (Kalmijn, 1994), may also have occurred in Kuwait, particularly among cou-

ples married 31 years or more who show high correlations for Farsi fluency, occupation, education, and religiosity or lack thereof. Elsewhere, Kalmijn (1994: 422) reported that "assortative mating by cultural status may be more important than assortative mating by economic status"

This study suggests that modernization may be associated with increased spousal concordance for some physical traits, especially stature. For most cultural characteristics, spousal correlations are high and significant regardless of marriage duration. Mate selection may aggregate certain phenotypes in a population, resulting in spousal similarity for stature, body composition, and blood pressure; however, at least in Kuwait, correlations for physical characters generally show the strongest spousal concordances in both the longest (31 years or more) and shortest (15 years or less) marriages with intervening cohorts showing little to no correlation.

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